SMITHSONIAN MISCELLANEOUS COLLECTIONS
VOLUME 117, NUMBER 9

Roebling Fund

PRECIPITATION AND TEMPERATURE IN WASHINGTON, D. C., FOR 1951 AND 1952

BY
C. G. ABBOT
Research Associate, Smithsonian Institution

(Publication 4087)

CITY OF WASHINGTON
PUBLISHED BY THE SMITHSONIAN INSTITUTION
MARCH 18, 1952

The Lord Baltimore Press
BALTIMORE, MD., U. S. A.

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A. PRECIPITATION AT WASHINGTON

Based on a cycle of 27.0074 days, I have predicted about 175 dates each year when precipitation in Washington, expressed as the average value per day, should exceed that quantity for all other dates.[1] The

TABLE 1.—*Statistics of Washington precipitation, 1951*

(Values in inches)

	Jan.	Feb.	Mar.	Apr.	May	June
Average per day Pfd.	0.053	0.152	0.169	0.154	0.183	0.277
Average per day All other	0.085	0.040	0.040	0.111	0.031	0.337
Ratio $\frac{\text{Pfd.}}{\text{All other}}$	0.62	3.80	4.22	1.39	5.98	0.82
Total ppt.	2.18	2.57	3.17	3.93	3.23	9.28
Normal ppt.	3.55	3.27	3.75	3.27	3.70	4.13
Percent of normal	0.61	0.79	0.85	1.20	0.87	2.25

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average per day Pfd.	0.028	0.088	0.089	0.036	0.197	0.174	0.134
Average per day All other	0.129	0.018	0.089	0.066	0.117	0.133	0.100
Ratio $\frac{\text{Pfd.}}{\text{All other}}$	0.22	4.89	1.00	0.55	1.68	1.31	1.34
Total ppt.	2.50	1.75	2.67	1.66	4.79	4.77	42.50
Normal ppt.	4.71	4.01	3.24	2.84	2.37	3.32	42.16
Percent of normal	0.53	0.44	0.83	0.58	2.02	1.44	1.01

ratio of precipitation, $\frac{\text{preferred dates}}{\text{all other dates}}$, has exceeded unity each year for 18 consecutive years. The value of this ratio for the year 1951 is 134 percent. The expected value is 142 percent, and the average of it, for 18 years, is 146 percent. Details for the year 1951 are given in table 1.

Preferred days of 1951 had a higher average precipitation than all

[1] See Smithsonian Misc. Coll., vol. 104, Nos. 3 and 5, 1944; vol. 111, No. 17, 1950; vol. 116, No. 4, 1951.

other days in all months but January, June, July, September, and October. In September the ratio was 1.00. In June 5.08 inches of rain fell within 12 hours of preferred dates, so that the prediction on these dates was but a half day amiss.

TABLE 2.—*Predicted dates when average daily precipitation should exceed average daily precipitation for all other dates for the year 1952 in Washington, D. C.*

"Preferred" cycle places	Jan.	Feb.	Mar.	Apr.	May	June
I	10	6	4, 31	27	24	20
II	11	7	5	28, 1	25	21
III	12	8	6	29, 2	26	22
IV	13	9	7	30, 3	27	23
V	14	10	8	4	28, 1	24
XII	21	17	15	11	8	4
XIII	22	18	16	12	9	5
XV	24	20	18	14	11	7
XVII	26	22	20	16	13	9
XVIII	27	23	21	17	14	10
XXII	31, 4	27	25	21	18	14
XXVI	..	..	29, 2	25	22	18
XXVII	..	..	30, 3	26	23	19

"Preferred" cycle places	July	Aug.	Sept.	Oct.	Nov.	Dec.
I	17	13	9	6	2, 29	26
II	18	14	10	7	3, 30	27
III	19	15	11	8	4	28, 1
IV	20	16	12	9	5	29, 2
V	21	17	13	10	6	30, 3
XII	28, 1	24	20	17	13	10
XIII	29, 2	25	21	18	14	11
XV	31, 4	27	23	20	16	13
XVII	6	29, 2	25	22	18	15
XVIII	7	30, 3	26	23	19	16
XXII	11	7	30, 3	27	23	20
XXVI	15	11	7	31, 4	27	24
XXVII	16	12	8	5	28, 1	25

Table 2 gives the dates in 1952 when the average daily precipitation in Washington is expected to exceed the average daily precipitation in this city for all other dates. Readers should neglect the first column of the table, to avoid being confused. It merely gives, in Roman numerals, the "preferred days" in the standard 27-day period. The other columns show when these dates occur in all the months.

While it is expected that the dates given in table 2 for the months of 1952 will yield a higher average of daily precipitation than this aver-

age for all other dates of 1952 in Washington, the probability that any individual date of the table will have any precipitation at all is not greatly above 50-50.

The basic tabulation, on which table 2 rests, began with January 1924 and ended with December 1941. The length deduced for the precipitation cycle is 27.0074 days. In 379 cycles of this length there are 10,235.8046 days. From January 1, 1924, to December 31, 1951, there are 10,227 days. Hence the 379th cycle begins on January 10, 1952, as given in table 2.

This paper was prepared on January 14, 1952, but could not be circulated in printed form until March 1952. Readers who may wish to extend table 2 to cover the first three months of 1953 should note that January dates are four days earlier than December dates, February four days earlier than January and March and one day earlier than February in 1953.

B. TEMPERATURE AT WASHINGTON

In previous papers [2] I have noted a period of 6.6485 days in the temperatures of Washington and New York, which has subsisted, on the average, unaltered since 1910, though individual recurrences of it are apt to depart one, two, and sometimes three days from regularity.

In table 3 I give the dates predicted for minima in 1951, the dates when minima occurred, and the dates predicted for minima in 1952. The predicted dates tabulated are those within a half day of those accurately computed for minima, based on a cycle of 6.6485 days, with zero date January 17.0000, 1946.

Figure 1 shows the relative frequency of departures of zero and ± 1, 2, 3 days from the computed dates of minima of temperatures.

As another graphical example of the close accordance between computed and observed minima of temperature in Washington I submit figure 2. This gives the departures from normal temperatures in Washington from March 21 to May 10, 1951. At the exact places of minima, as computed with the cycle of 6.6485 days, from January 17.0000, 1946, heavy solid lines are drawn. As shown in the paper just cited (Smithsonian Misc. Coll., vol. 111, No. 13, p. 6), a subsidiary cycle of $\frac{6.6485}{2}$ days was discovered. Dotted heavy lines represent the places of minima of temperature at Washington for this subsidiary cycle. It will be apparent that all the minima of the curve of temperatures in figure 2 fall within one day of these heavy lines, indicating places of computed minima.

[2] Smithsonian Misc. Coll., vol. 107, No. 4, 1947; vol. 111, No. 6, 1949; vol. 111, No. 13, 1949; vol. 116, No. 4, 1951.

TABLE 3.—*Dates in 1951 when minima in Washington temperatures were predicted and observed, and dates predicted in 1952*

	January	February	March
1951 predicted	6 13 19 26	2 8 15 22 28	7 14 20 27
1951 observed	8 13 22 26 31	3 8 15 24	3 10 22 26
1952 predicted	6 12 19 26	1 8 15 21 28	6 12 19 25
	April	**May**	**June**
1951 predicted	3 10 17 23 30	7 13 20 27	2 9 16 22 29
1951 observed	3 10 17 23 28	5 12 19 29	5 10 13 19 29
1952 predicted	1 8 14 27 28	4 11 18 24 31	7 13 20 27
	July	**August**	**September**
1951 predicted	6 12 19 25	1 8 14 21 28	3 10 17 22 29
1951 observed	6 13 20 24	2 6 13 24 28	8 18 24 29
1952 predicted	3 10 16 23 30	5 12 19 25	1 8 14 21 28
	October	**November**	**December**
1951 predicted	6 12 19 26	1 8 15 21 28	4 11 18 24 31
1951 observed	10 20 29	3 8 .. 19 28	10 16 22 27
1952 predicted	4 11 18 24 31	7 13 20 26	3 10 16 23 30

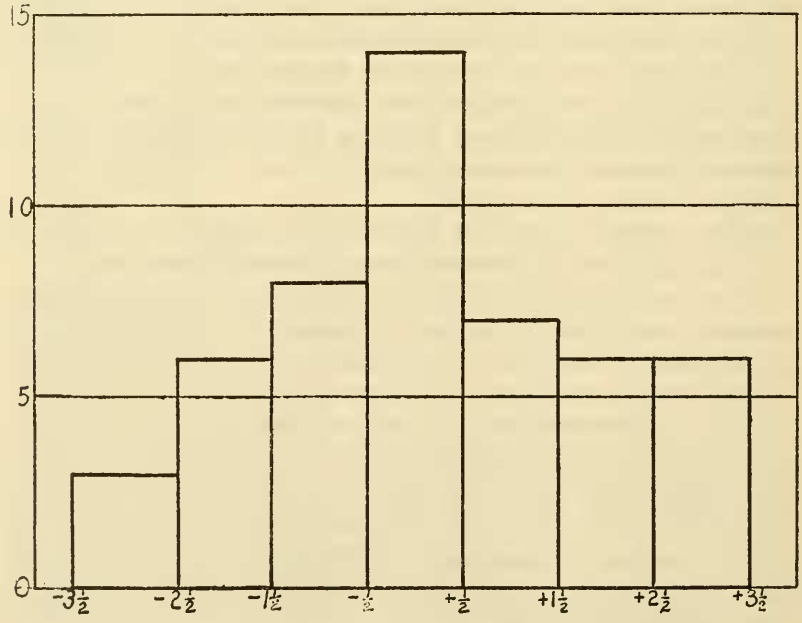

FIG. 1.—Relative frequency of minima of temperature at Washington 0 to ± 3 days from dates predicted.

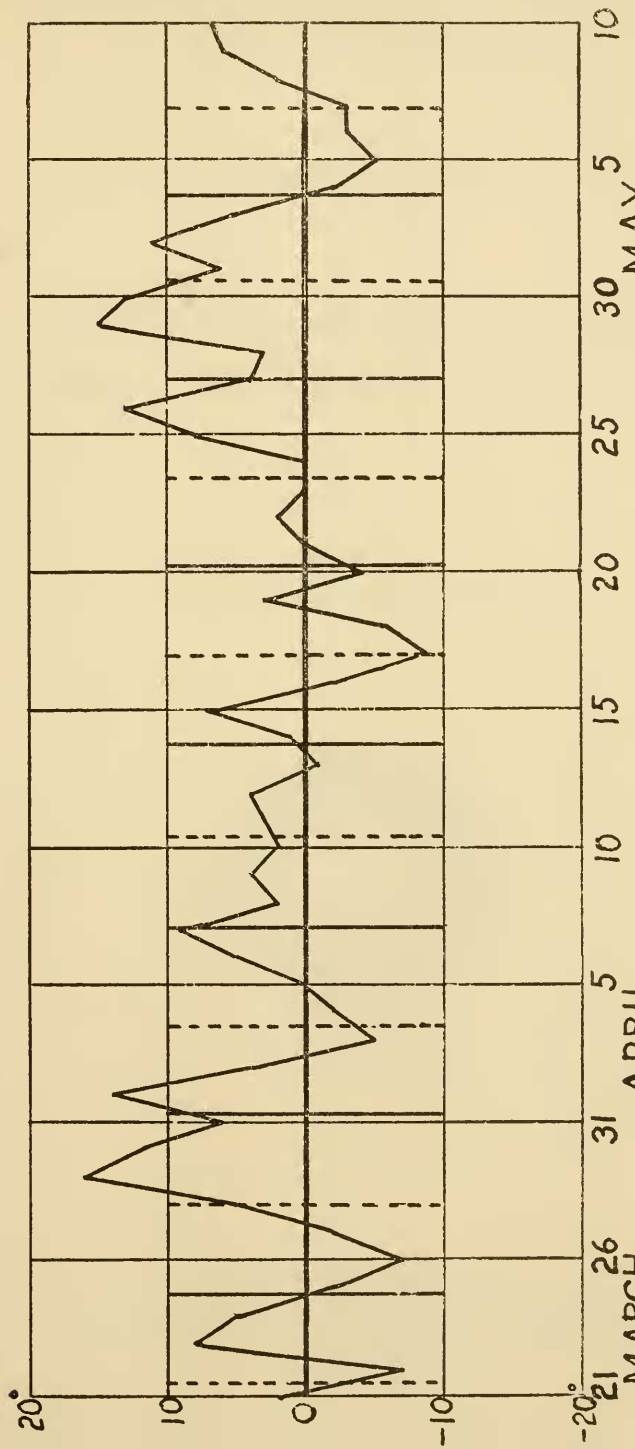

FIG. 2.—Departures from mean temperatures at Washington March 21 to May 10, 1951. Heavy solid lines are dates computed from January 17, 1946, by cycle of 6.6485 days. Heavy dotted lines are similarly for cycle of $\frac{6.6485}{2}$ days.